EV Codes and Standards

International Harmonization

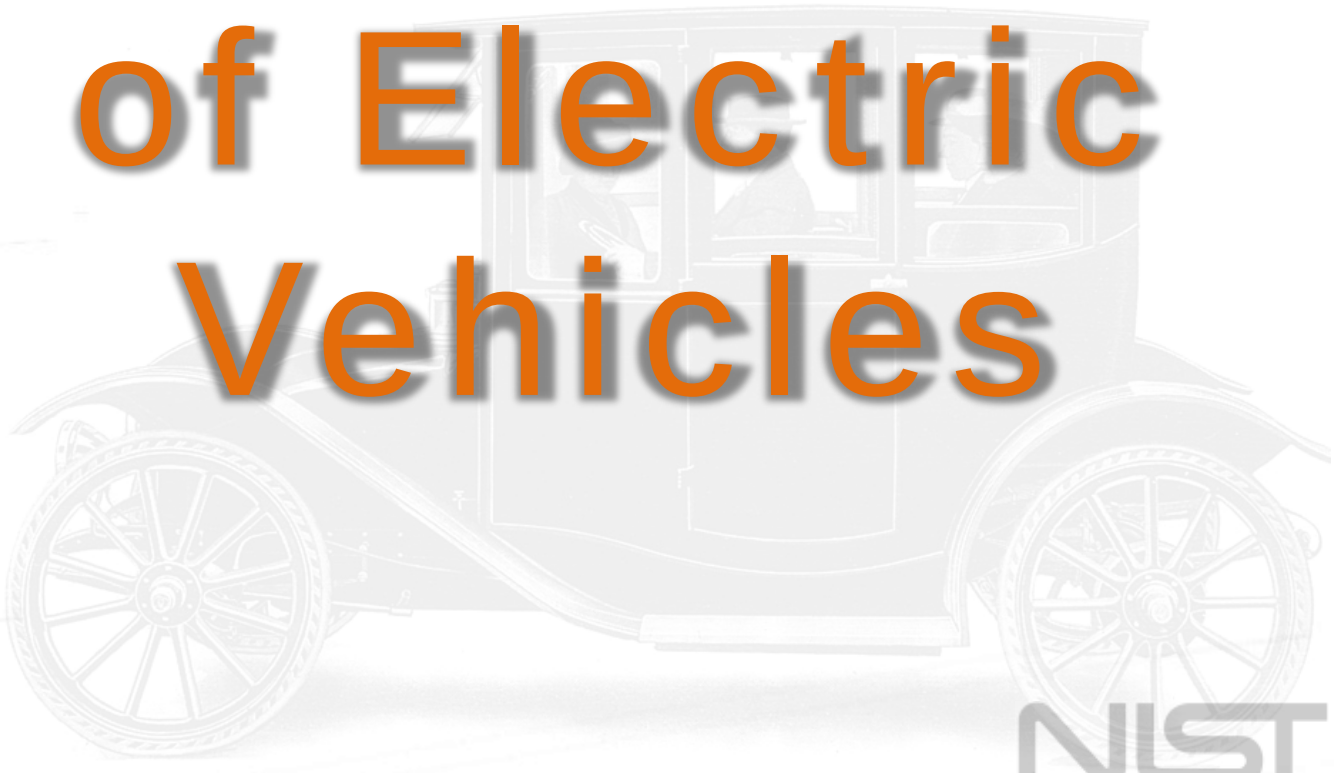
National Institute of Standards and Technology
Technology Administration, U.S. Department of Commerce

EV Standards Goals

- Safe vehicles and charging systems
- Well characterized performance
- Easy to use systems
- Reduced costs
- Increased reliability
- Positive impact on power grid

Shared Goal

Adoption of Electric Vehicles

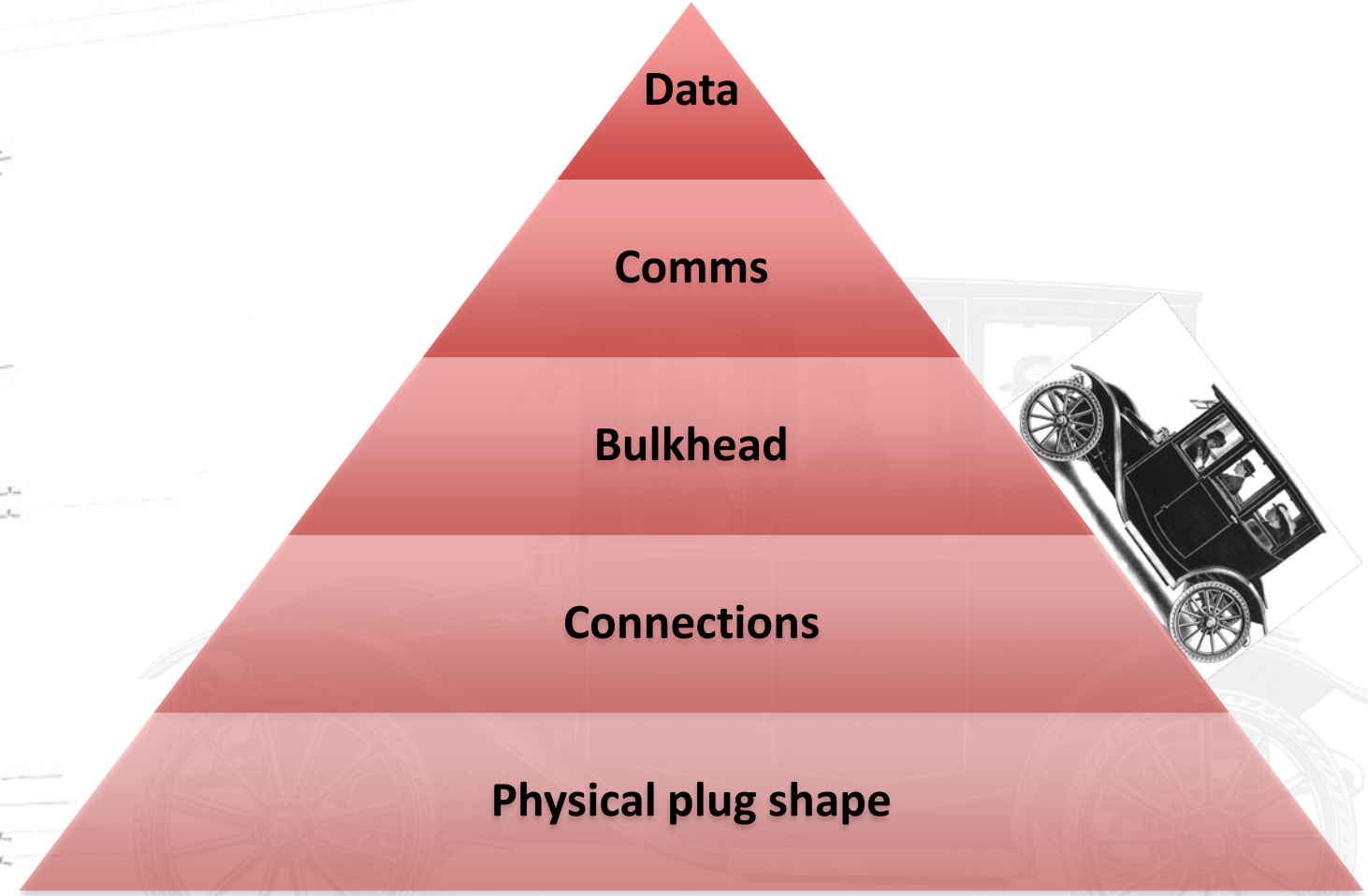


NIST

Effect of Disharmony

- **Equipment Manufacturer**
  - Unnecessary Complexity
    - Increased inventory
    - Increased testing
    - Decreased reliability
  - Increased cost
- **Utility**
  - Decreased reliability
  - Increased risk
  - Increased cost
- **Consumer**
  - Limited choices
  - Decreased reliability
  - Increased cost

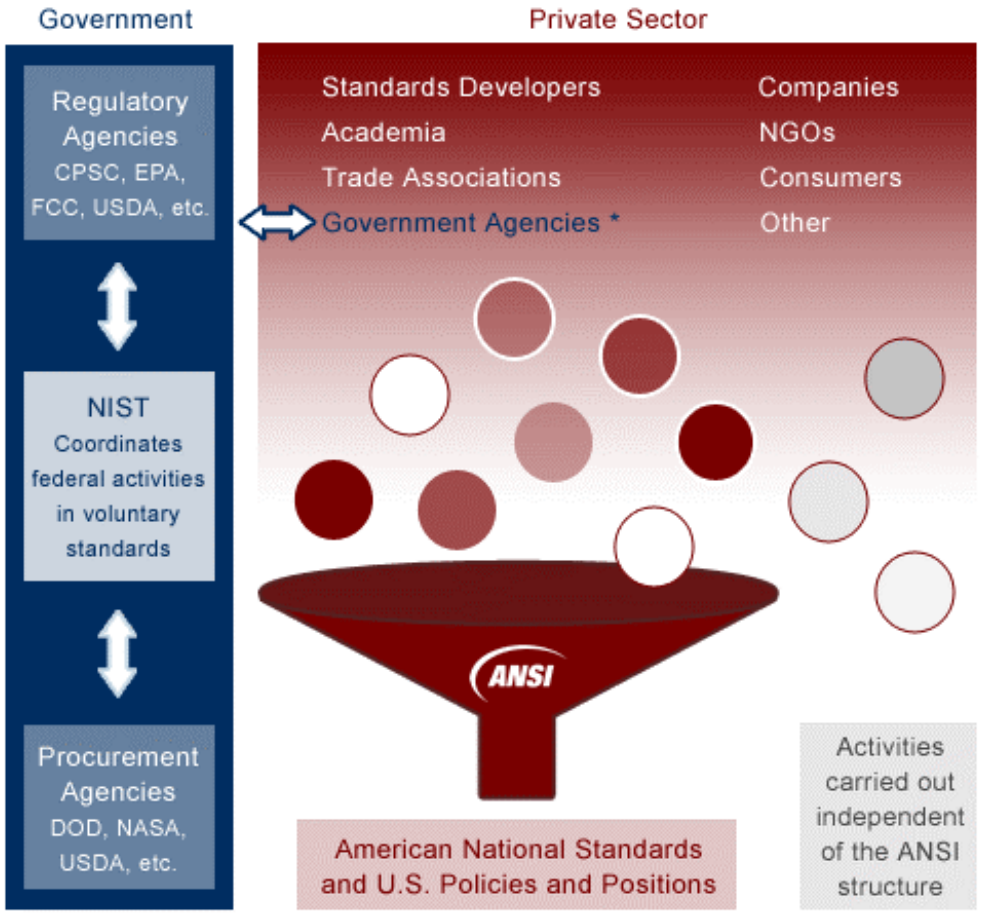
Levels of Interoperability Charging Systems Example



NIST Introduction

- Founded in 1901 as the “National Bureau of Standards”
- Part of the U.S. Department of Commerce
- Supports business innovation and industrial competitiveness by advancing measurement science, standards, and technology
- Provides objective expertise to industry and SDOs

USA Standards System



* Government agencies are members of ANSI and of SDOs. Agencies participate directly in voluntary standards development and policy setting and use voluntary standards when it supports their missions.

Vehicle 2 Grid Interaction

- Coordinate the development of interoperability standards for Smart Grid (SG) systems
- focus on charging infrastructure and interaction between electric vehicle and grid

- Analyze
  - Goals (what we are trying to achieve)
  - Use cases (how we will use the system)
  - Existing standards

Electric Vehicle Standards Panel

ANSI
American National Standards Institute

- To foster coordination and collaboration on standardization matters among public and private sector stakeholders* to enable the safe, mass deployment of electric vehicles and associated infrastructure in the U.S. with international coordination, adaptability and engagement

- To produce a strategic roadmap and/or reports identifying the standards and conformity assessment programs needed to facilitate the widespread acceptance and deployment of electric vehicles.

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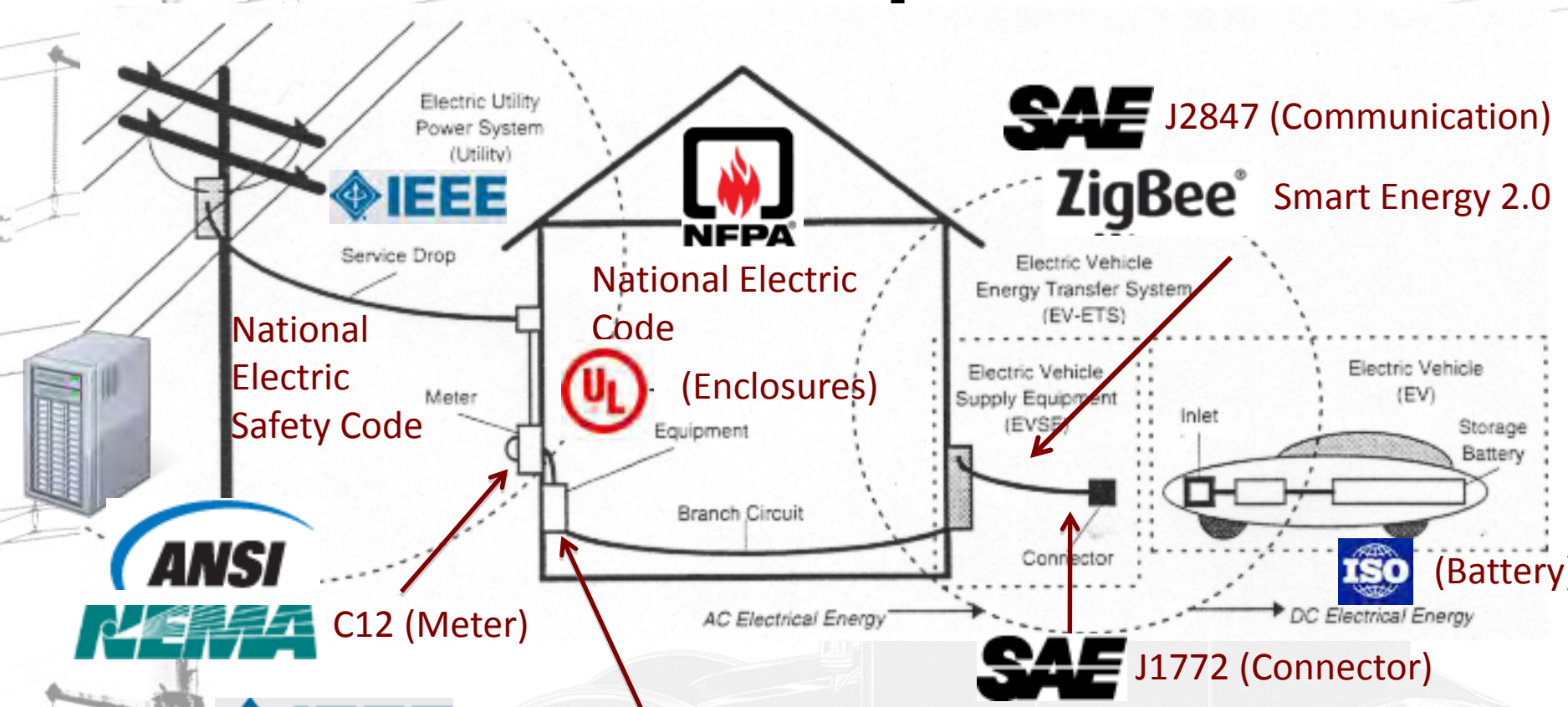
China-US Mapping effort

- Create list of US and China EV related standards
- Map between the two standards lists
- Compare with shared goals
- Identify areas for harmonization
- Harmonize
- Expand from US-China to global efforts

V2G Example Standards



IEEE

National Electric Safety Code

NFPA

National Electric Code

UL (Enclosures)

SAE J2847 (Communication)

ZigBee® Smart Energy 2.0

ANSI

NEMA C12 (Meter)

ISO (Battery)

SAE J1772 (Connector)

IEEE 1547 (Distributed energy interconnection)

IEC 61850 and 61970/61968 Information models

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Asia Pacific Economic Council (APEC)

- Smart Grid interoperability standards identified as an emerging regulatory issue with significant potential to impact trade and investment in the APEC region.

- Proposed recommendation:
  - Develop shared objectives for electric vehicle charging infrastructure (e.g., minimize financial risks for local investments, enable product market competition, and facilitate upgrade paths) that lay out the case for interoperability.
  - Collectively conduct a mapping exercise and gap analysis of interoperability standards under development against those shared objectives.

PEV Resources

SGIP V2G DEWG

- http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/V2G

Contact

Eric Simmon

Smart Grid Interoperability Task Force

National Institute of Standards and Technology

eric.simmon@nist.gov

+1 301-975-3956